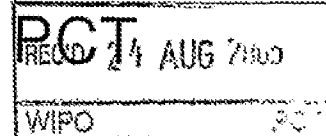


From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220



WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/US2005/006635

International filing date (day/month/year)
25.02.2005

Priority date (day/month/year)
27.02.2004

International Patent Classification (IPC) or both national classification and IPC
H03M13/27, H03M13/29

Applicant
QUALCOMM INCORPORATED

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
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Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material:
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing:
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. II Priority

1. ☒ The validity of the priority claim has not been considered because the International Searching Authority does not have in its possession a copy of the earlier application whose priority has been claimed or, where required, a translation of that earlier application. This opinion has nevertheless been established on the assumption that the relevant date (Rules 43bis.1 and 64.1) is the claimed priority date.
2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43bis.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.
3. Additional observations, if necessary:

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Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | |
|-------------------------------|-------------|--------------------|
| Novelty (N) | Yes: Claims | 3-13,15-28,31-34 |
| | No: Claims | 1,2,14,29,30,35,36 |
| Inventive step (IS) | Yes: Claims | |
| | No: Claims | 3-13,15-28,31-34 |
| Industrial applicability (IA) | Yes: Claims | 1-36 |
| | No: Claims | |

2. Citations and explanations

see separate sheet

Re Item V.

1. Reference is made to the following documents:

D1: US2002/0124227

D2: Qiang Wu, Eduardo Esteves, "The cdma2000 High Rate Packet Data System", Revision A, 26.3.2002, XP002303829

2. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1, 2, 14, 29, 30, 35, 36 is not new in the sense of Article 33(2) PCT.

2.1 D1 discloses:

A communication device, comprising:

a mapper for receiving a first value and a second value and generating a plurality of third values (Figure 1 (12); Figure 2);
a plurality of memory banks, each memory bank adaptable to store one of the third values (Figure 4 (41); Figure 5); and
a controller (implied) for directing each of the plurality of third values to a selected one of the plurality of memory banks (Figure 5) for simultaneous (parallel arrangement of shift registers in Figure 5) storing according to a storing pattern (implied).

2.2 D1 discloses further:

The communication device of claim 1, wherein the first and second values are In-phase (I) and Quadrature (Q) values, respectively (Figure 2, showing a I,Q constellation map).

2.3 D1 discloses still further:

The communication device of claim 1, wherein the third values are soft decision values (Figure 5b, paragraph 56).

2.4 Additionally, the following is noted:

Figure 2 shows a 'mapper'. Input values are the I and Q values (coordinates of the

diagram). Output, third values are R2, R1, R0, which signify systematic and parity bits of the coded signal. As shown in Figure 5b, the R0, R1, R2 bits are assigned soft values which are then inputted to the memory banks of the shift register as indicated in Figure 5. A storing pattern clearly has to be observed during inputting.

2.5 Due to the broad definition of claim 14, its subject-matter is implied in D1. "Cycles" are also disclosed in D1 in that one cycle consists of "cycling" through the three shift registers (memory banks). A "selected subset" would then consist of one shift register. The use of address offsets are evident.

Therefore, the subject-matter of claim 14 is not novel, contrary to Article 33 (2) PCT.

2.6 The same observations apply, mutatis mutandis, to claims 29, 30, 35, 36.

2.7 Therefore, the subject-matter of claims 1, 2, 14, 29, 30, 35, 36 is not novel, contrary to Article 33 (2) PCT.

3. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 3 - 13, 15 - 28, 31 - 34 does not involve an inventive step in the sense of Article 33(3) PCT.

3.1 D1 discloses the transformation of third values to soft values after the storing of third values into the memory banks and retrieving them back whereas claim 3 defines the third values to be soft values prior to storing them into memories. This is considered to be an obvious constructional detail of the implementation. Similarly, soft-values are normally expressed by log-likelihood ratios by the skilled person.

Therefore, the subject-matter of claims 3 and 4 is obvious, contrary to Article 33 (3) PCT.

3.2 Claim 7 defines selecting a certain storage pattern from a plurality of storage patterns according to the transmission format used. This solves the problem of adapting the communication device to several transmission formats, which all comprise differently interleaved data sequences.

However, D2, which seems to be the relevant prior art, disclosing the IS 856 standard, and also being cited in the description on page 1, discloses the physical layer description and in particular, in table 3-4 on page 3-9, that the channel has a number of different packet

types and modulation rates at its disposal. The skilled person is therefore obliged to construct a receiver which accounts for different transmission modes and equivalently, for different interleaver modes. Moreover, it is understood that D2 implies changing the interleaver mode along with the transmission format.

The solution is found in D1, which discloses the adaptation of the receiver end to different transmission formats by downloading a new interleaver scheme and selecting one of the schemes for transmission, hence changing the address sequence generated by the address generator (paragraph 58). The plurality of memory banks of claim 1, controlled by a controller, is, technically speaking, nothing else than an interleaver.

Thus, incorporating the teaching of D2 into D1, the skilled person would arrive at the subject-matter of claim 1 without an inventive step, contrary to Article 33 (3) PCT.

3.3 Claims 8 to 13 limit claim 7 further in that well-known transmission formats (8PSK, etc., different rates, etc.) are used. The use is obvious for the skilled person. Therefore, the subject-matter of claims 8 to 14 is obvious, contrary to Article 33 (3) PCT.

3.4 Claim 15 defines the storing pattern (offsets) are assigned in accordance with an encoding pattern. This, however, is obvious as the encoded data is supposed to be decoded by the communication system of claim 15. This is only possible if the mentioned selection are chosen according to the encoding pattern. Therefore, the subject-matter of claim 15 is obvious, contrary to Article 33 (3) PCT.

3.5 Claims 5, 6 and 16 to 28 seem to define the scheduling algorithm with which incoming symbols are interleaved so to form sequential inputs to the input lines of the Turbo decoder. Given that Figures 4 to 8 in this application are taken from the standard IS-856 (D2), it is obvious for the skilled person to reverse the arrangement so that a decoder can work on it. The problem, the claims of the present application attempt at solving is how to decode the received symbols correctly.

To this end, the subject-matter of the present claims seems to define a row/column interleaver. The transmitting side writes symbols row-wise into a matrix as it is disclosed in D2, Figure 3-5 (page 3-11) and reads symbols to be transmitted column-wise. At the receiving side, the process must be reversed. Therefore, a matrix is used similarly.

Memory banks of the claims signify rows (columns) of the matrix. A certain order of the U, U0, U0', V0, V0' symbols has to be observed such that a set of U, V0, V0' (16QAM) are adjacent in the respective memory bank, so to read them into the U, V0, V0' line of the Turbo decoder. D2, Figure 3-5, discloses the interleaving schematically.

This order of writing the symbols back into the memory banks is obvious for a skilled person knowing the IS-856 standard, because it constitutes just the reverse of the transmitting side, which is defined in prior art.

Moreover, the claims of the present application seem to define the interleaver/symbol buffer structure of Figure 10 of the present application. However, such a structure in which demultiplexers are arranged in front of each memory block, the demultiplexers having the same input line, is well-known in the art.

Given the IS-856 standard, the skilled person, trying to solve the problem of dearranging received symbols for decoding, would chose such a structure as presented in Figure 10 as a straightforward way of implementing as a row/column interleaver. The storage pattern is the reverse of the storage pattern defined in prior art.

Therefore, the subject-matter of claims 16 to 28 is obvious, contrary to Article 33 (3) PCT.

3.6 The same observation applies, mutatis mutandis, to claims 31 - 34.

4. Claim 1 is not concise and not clear, contrary to Article 6 PCT.

4.1 A 'mapper' is not a concise term in the art of electronic communication, Its meaning is unclear.

4.2 Generating arbitrarily third values, without defining even their function, does not confer a clear function to the "mapper".

4.3 "a plurality of memory banks": Each memory can be assumed to be made up of memory banks. This feature does not confer any further definition of a technical feature to the claim.

4.4 The controller's function is unclear. No function of the controller in the definition of claim 1 can be found merely by stating that the plurality of third values are directed to a

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AUTHORITY (SEPARATE SHEET)**

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selected one of plurality of memory banks. Thus, the technical features of claim 1 are unclearly defined, contrary to Article 6 PCT.